

One adult male was transferred to Trivandrum Zoo, from Trichur Zoo on 9.9.1964. A female was added on 29.9.1965 and another on 13.12.1967. Four offsprings were born on the following dates, 4.2.68, 5.11.68, 1.5.69 and 11.12.69. The first one died on 1.4.69 and the last on 30.1.72. The second was exported and the third was supplied to the Mysore Zoo.

The original male died on 21.3.72 and the female on 10.8.69. The other female was also exported.

During this period only the original male developed the saddle mark. As I was observing the animal every day, it is difficult for me to state with precision when it started developing the saddle. The saddle becomes noticeable

very gradually. It may be from 5 to 8 years.

The food given to adults per day is as follows: Bengalgram 100 gms, Cattle feed 500 gms, Horsegram 200 gms, Plantains 500 gms, Fodder 2.5 kg., and Napier Grass 5 kgs.

In the Zoo the tahr enjoy concentrates more than green fodder. They like the fodder to be tied above ground level so that they can browse.

I have not seen them drinking during my visits to their run. They seldom drink.

On 22.1.76 one pair of tahr aged 1 month was caught at Eravikulam and these are doing well. I have seen them mating recently. However, the mating has not been successful.

SUPERINTENDENT,
ZOOS & GARDENS,
TRIVANDRUM-1,
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6. A FURTHER NOTE ON *MOSCHUS*

Since contributing a note on the taxonomy of *Moschus* to this *Journal* (Groves 1976) the author has seen a number of further specimens which was unavailable to the author at that ranges, both geographical and altitudinal, of the two species in the Indian region. A taxonomic contribution by Dao van Tien (1969), which should be recorded as they extend the time, should also be evaluated now.

Two species of Musk-deer are found in Indian and Nepalese territory: *M. sifanicus* has light brown fur, the backs of the ears are rim-

med with pure yellow, the skull length averages about 160 mm, and the lacrimal bone is long and low; *M. chrysogaster* has dark brown fur, the ear-backs are wholly dark, the skull length is about 150 mm, and the lacrimal is relatively short and high. The former, which lives above the tree-line, is represented in China by a race in which the whole tip of the ear, not just the rim, is yellow, but which is otherwise poorly distinguished and is in any case unnamed; the latter species, which lives in forest and is represented in India and Nepal

by its nominate form, is smaller and short-faced, though it was pointed out that in fact two subspecies would probably be better recognised in China (see below).

It must be mentioned that in the table of skull measurements (Groves, 1976:674), there is a misprint. Two headings read "*M. sifanicus*": only the second of these is correct, the first being a lapsus for "*M. c. chrysogaster*".

The additional specimens examined are as follows:

1. *M. sifanicus*

Two skins, one skull and a headskin in the Powell-Cotton Museum, Birchington, Kent, England. T.31.2 is a skin and skull; the skin is light tobacco brown, fading to off-white on head, shoulders and again on rump. The ears are yellow-rimmed. Skull broken, but its length is approximately 160, lacrimal 21 x 14; midpoint of skull probably in orbit. Locality is Baital, Kashmir (not found on any map). The other complete skin (no number) and the headskin (M.46.99) have no locality beyond "Kashmir", but are clearly of this species.

2. *M. chrysogaster chrysogaster*

The Powell-Cotton Museum possesses an incomplete skull that is probably of this form, numbered T.31.3, from Srinagar, which (if it is the actual locality rather than a base camp) is in the forest zone. The length would have been about 145 mm.; lacrimal 23 x 20; midpoint would have been approximately at the front edge of the orbit.

The Zoological Survey of India, Calcutta, has three specimens: two skins with skulls (see Biswas & Khajuria, 1957) and unmatched skin. The first two are nos. 12448 and 12449, of the "Daily Mail" expedition, 1954; localities respectively Thami and Hunko, both at 13,000 feet but, because of the protected locations, in the forest zone (mainly rhododendron

and juniper). Skins are dark brown with ear-backs dark, becoming nearly black towards the tips. The skull of the former is 145 mm. long, with lacrimal 25 x 19; the other specimen is immature, with third molars not yet erupted, but skull length is 140, lacrimal 23 x 15. In both, skull midpoint is well within the orbit. The metacarpal length of 12448 is 93.5, metatarsal length 126; both these measurements are slightly above the figures for *M. c. berezovskii* given by Flerov (1952) and Kao (1963), but well below the limits for *M. sifanicus* given by the same authors. The third skin, no. 12451 from Khumbu, 12,000 feet, closely resembles the other two.

Two head-skins and a partial skull are preserved in the palace at Wankaner, Gujarat; they were obtained by M. K. Ranjitsinh at Shodu, Bhutan (in the rhododendron zone), and are the only known specimens from Bhutan. The head-skins are very dark grey-brown, the ears being dark especially on the terminal half. The skull, which may belong with one of the skins, is incomplete but is clearly short-faced.

The importance of the above specimens is that they confirm the distinctiveness of the two species, the association of skull and skin characters, where both are represented for the same specimen, being demonstrated; and that they confirm the association of each with a different habitat type, even when the forest zone extends to a higher altitude than usual.

A recent paper by Dao (Dao 1977) refers to a taxon, *Moschus moschiferus caobangis* Dao, 1969, from North Vietnam and provides the first description of this in French (the original description being in Vietnamese). Dao's papers were based on the old single-species theory, and clearly written without knowledge of Groves's revision, but neatly extend the results. It is clear from the description that *cao-*

bangis is Groves's "*M. chrysogaster* subsp." recorded from Kwangsi, to which the British Museum specimens from Ichang also probably belong:

(1) Dao's new race is described as "brun grisatre", which approximately describes B.M.1.3.2.6 from Ichang; Wang *et al.* (1962) describe a specimen from Kwangsi as "brown". Skins of *M. c. berezovskii* from Szechwan, Kansu, Shensi and Shansi are described as darker than this ("dark olive-brown with a red tinge" in Kao, 1963, which describes B.M.3.5.15.6 and 11.9.8.144, both from Szechwan).

(2) Skulls in two *caobangis* are 113 and 132 mm. long; the second of these, the type, is figured, but it is not stated whether the other is adult or not. Kao's (1963) Kwangsi skull is 121 mm., whereas all his and other authors' other *berezovskii* skulls are at least 136 mm. Wang *et al.* (1962) report a Kwangsi skull as being 116.7 mm, but this may actually mean the basal length; it is, at any rate, short. The Ichang skulls in the British Museum are 135 and 141 mm, so overlapping with one of Flerov's (1952)

specimens, whose age is however not stated. (The locality "Peling Mts.", whence comes a rather large skull, is probably not Mt. Pai Ling in Kwangsi as surmised by Groves (1976), but the Pai-Lung Chiang in southern Kansu.)

The light colour probably, and the small size definitely, validate Dao's subspecies; it extends into Kwangsi and probably even as far as Ichang. *M. moschiferus caobangis* Dao, 1969, and "*M. chrysogaster* subsp. uncertain" of Groves, 1976, therefore both become *M. chrysogaster caobangis*.

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REFERENCES

BISWAS, B. & KHAJURIA, H. (1957): Zoological results of the "Daily Mail" Himalayan expedition, 1954. Notes on some mammals of Khumbu, eastern Nepal. *Proc. Zool. Soc. Calcutta, Mookerjee Memor. Vol.*, 229-253.

DAO VAN TIEN (1969): Ve hai loai huou o Viet nam, huou sao (*Cervus nippon*) va huou xa (*Mos-*

chus moschiferus). *Thong bao khoa hoc, Sinh vat hoc, Dai hoc tong hop Ha noi*, 4:49-53.

————— (1977): Sur quelques rares mammiferes au nord du Vietnam. *Mitt. Zool. Mus. Berlin*, 53:325-330.

FLEROV, C. C. (1952): Musk and deer. Fauna of USSR, Mammals, vol. 1.

MISCELLANEOUS NOTES

GROVES, C. P. (1976): The taxonomy of *Moschus* (Mammalia, Artiodactyla), with particular reference to the Indian region. *J. Bombay nat. Hist. Soc.*, 72:662-676.

KAO YUEH-TING (1963): Taxonomic notes on the

Chinese musk-deer. *Acta zool. sinica*, 15:479-488.

WANG SUNG, LU CHANG-KWUN, DAO YUEH-TING & LOO TAI-CHUN (1963): On the mammals from south-western Kwangsi, China, *Acta zool. sinica*, 14:555-568.

7. REPORT OF THE OCCURRENCE OF THE METAD IN WEST BENGAL

In the afternoon of the 17th February, 1978, while digging rodent burrows in a harvested paddy field, south of Apurbapur village near Singur in Hugli District, we caught an adult female rat with five juveniles, which were identified as of the Soft-furred Field Rat or Metad, *Millardia meltada* (Gray).

The known distribution of *Millardia meltada* (Gray), is Bihar, Uttar Pradesh, Nepal Tarai, Punjab, Haryana, Rajasthan, Peninsular India south of the Satpura-Vindhya ranges, south to Nilgiris, south-western Sri Lanka, parts of Gujarat and the adjacent region of Pakistan, but does not include the north-eastern part of India (Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Tripura and Mizoram), Orissa and West Bengal. The present collection, therefore, constitutes the first authentic

record from West Bengal.

The details of the specimen is given below. The external measurements were taken in the field and are in mm.

Material: 1 ♀; ZSI Reg. No. 19935; in alcohol; 17.2.78; A. K. Mondal Coll.

Measurements: External—Head and body 111.0; tail 76.0; hind foot 22.0; ear 20.0.

Cranial—Occipitonasal 31.4; condylobasal 30.5; nasal 11.5; palate 16.4; bulla 6.1; tooth row 5.6; anterior palatine foramina 7.4; diastema 8.8.

In comparison with the recognised subspecies of *Millardia meltada* namely, the *Millardia meltada meltada* (Gray) and the *Millardia meltada pallidor* (Ryley), the present material is much darker. However, without examination of additional material nothing definitely could be said of its subspecific status.

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SANTANU GHOSH

8. SOME OBSERVATIONS ON THE BIOLOGY OF THE OPENBILL STORK, *ANASTOMUS OSCITANS* (BODDAERT), IN SOUTHERN BENGAL

(With a plate)

The Openbill Stork [*Anastomus oscitans* (Boddaert)] is the smallest and commonest stork of our country.

This paper reports on observations made in

South Bengal in Saknakhali bird sanctuary in the Sundarban Reserve Forest, Sagar Island, Frazergunge and Diamond Harbour by the author from 1975 onwards.